U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center
Honolulu Laboratory
P. O. Box 3830
Honolulu, Hawaii 96812

U.S. SOUTHWEST FISHERIES CENTER
File
JUN 07 2004
Copy
LIBRARY

THE 1976-78 STUDIES OF THE KAILUA-KONA, HAWAII, BILLFISH FISHERY PART I COMMERCIAL/RECREATIONAL COMPONENT

March 1982

INTRODUCTION

This report is the first of three presenting the major findings of a series of surveys undertaken in 1976-78 on the Kailua-Kona, Hawaii, billfish fisheries. The present report contains information on both commercial and recreational fishers residing in Kailua-Kona. The two reports to follow will present information on charter boat operators and their customers in the Kailua-Kona area.

In July 1977, Research Associates Inc. submitted a report entitled "A study of bio-economics and optimal management criteria for utilization of Pacific billfish" to the Southwest Fisheries Center, Honolulu Laboratory of the National Marine Fisheries Service (NMFS). This report was followed in December 1977 and May 1978 by reports on additional surveys, also performed by Research Associates. These surveys concentrated on the Kailua-Kona district of the island of Hawaii.

Although the data collected by these surveys have been used in fisheries management planning, the reports have not been readily accessible by the public. The results of these studies were partially reported by Adams[1] and in an extrapolation of these results prepared by Cooper and Adams in November 1978.[2] The results were also used by Adams in estimating the "value" of recreational fishing.[3]

The Fishery Management Research Task has prepared this edited and condensed version of the Research Associates reports in anticipation of further work on the charter boat fishery in Hawaii and of studies on recreational fishing "values." The original reports are still available at the library of the Honolulu Laboratory.

Because the reports were prepared under contract, the statements, findings, conclusions, and recommendations do not necessarily reflect the views of the NMFS. Since the contractor calculated averages and rates based on pounds and arbitrary pound-categories, we have not converted to kilograms to avoid introducing biases and cumbersome nomenclature.

---

[1]Adams, M. F. 1978. Alternative estimates of net economic benefits for billfish-tuna recreational-commercial fishermen in Kailua-Kona, Hawaii. Southwest Fish. Cent. Admin. Rep. 18H, 1978, 9 p. Southwest Fish. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812.

[2]Cooper, J. C., and M. F. Adams. 1978. Preliminary estimates of catch, sales, and revenue of game fish for the fishery conservation zone around the main Hawaiian Islands, by types of troll and longline vessels and by species, 1976. Southwest Fish. Cent. Admin. Rep. 24H, 1978, 10 p. Southwest Fish. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812.

[3]Adams, M. F. 1980. A multispecies household production analysis of recreational fishing with dispositional benefits. Southwest Fish. Cent. Admin. Rep. H-80-5, 21 p. Southwest Fish. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96812.

GENERAL APPROACH

Three complementary surveys were employed to accomplish the objectives of the study:

Two hundred personal interviews with small boat owners engaged in recreational and commercial fishing in the Kailua-Kona area;

Personal interviews with charter boat operators conducting business in the Kailua-Kona area; and

Personal interviews with representatives of government agencies, commercial fish brokers, fishing organization officers, and charter organization managers who were directly concerned with fishing activities in the Kailua-Kona area.

A personal interview approach was selected in order to gather the most complete and accurate information from respondents. This method offered the opportunity for interviewers to develop rapport with respondents and reassure them about the goals of the study and the confidentiality of the information gathered. It also served to encourage a higher response rate and decrease the number of inappropriate responses and "no-answers" to survey questions.

SURVEY RESULTS

Sampling

The sampling frame for this survey consisted of a computerized listing of registered Kona district boats provided by the Harbors Division of the State Department of Transportation. Research Associates requested a vessel listing of all motor-propelled boats, 14 ft or greater in length, registered to owners who resided in certain North and South Kona areas specified by the NMFS (zip codes 96704, 96725, 96726, 96740, 96750). Owners of fishing vessels less than 14 ft in length were excluded from the survey because it was not considered likely that they would engage in trolling and handlining in open-ocean waters.

The Harbors Division computer listing contained names of owners and registra- tion information about 622 boats identified as being appropriate to the sample request. A review of the listing, however, indicated certain errors requiring correction. A few of the boats listed were located on islands other than Hawaii, some were very large boats used for tourist cruises, and other boats were listed more than once. The final corrected sampling frame provided the names of 577 boat owners in the Kailua-Kona area.

Of these, 200 boat owners were actually interviewed. People were interviewed only if they fished for certain species--marlin (black marlin, blue marlin, striped marlin, shortbill spearfish, and sailfish), ono (wahoo), ahi (yellowfin or bigeye tuna), aku (skipjack tuna), and mahimahi (dolphinfish). Field interviewing began the last week of November 1976 and ended the first week in January 1977. The sample population was <u>not</u> stratified by whether the boat owners considered themselves "commercial" or "recreational," although information was collected which would allow such post-classification.

This sample was estimated to comprise about 50% of the total number of vessels fishing the Kailua-Kona area at the time. (These people were re-interviewed in 1977, and both sets of data are available in tabular and computerized form from the Honolulu Laboratory.) The questionnaire is appended to this report.

The results of interview attempts were as follows:

	Number	Percent
Interview completed	200	43.6
Respondent could not be reached*	140	30.5
Respondent does not fish	51	11.0
Respondent does not fish for species or interest	31	6.8
Respondent refused interview	18	3.9
Boat no longer owned	11	2.4
Inappropriate listing - canoe or sailboat owned	8	1.7
Total sample	459	100.0

*Included were boat owners who had moved to another area of Hawaii or off the island, persons traveling, ill, or hospitalized, and persons without a telephone whose place of residence could not be determined.

Description of the Fleet

1. The average boat length of Kona fishing vessels surveyed was 19 ft. A significant majority (73%) of the boats were powered by an outboard engine with an average horsepower of just over 100. Sixteen percent had outboard/inboard engines and 10% had inboards.

2. More than 70% of all fishermen had owned their boats less than 5 years. The mean number of years of ownership of respondent's present boat was 3 years.

3. The average boat cost at the time of purchase was $5,650. Perceived average value at the time of the interview was $6,220, for an average increase in boat value of $570.

4. Only 13% of all owners moored their boats at a harbor. A plurality of those (45%) used Honokahou; the remainder trailered their boat to a launching location. The most popular launching site was Keauhou, with 50% using that ramp, followed by Honokahou (36%).

The following tables present responses to questions in the commercial and recreational fishing questionnaire (see Appendix). The survey question and its number precede each table.

What is the length of your boat?

Length	Percent
14-15 ft	6
16-17	32
18-19	35
20-21	13
22-23	3
24-25	3
26-29	3
30-34	3
35 ft or more	2
Average length of boat	19 ft
BASE: Total commercial/ recreational fishermen	(200)
[Survey question 1.]	

What is the horsepower of your engine?

Horsepower	Percent
Less than 25	3
25-49	7
50-74	26
75-99	25
100-149	21
150-199	8
200 or more	9
No answer	1
Average horsepower of boat	107 h.p.
BASE: Total commercial/ recreational fishermen	(200)
[Survey question 7a.]	

How many years have you owned your present boat?

Number of years	Percent
Less than 1	11
1	21
2	21
3	17
4	11
5	7
6-8	8
More than 8 years	4
Average number of years owned present boat:	3 years
BASE: Total commercial/ recreational fishermen	(200)
[Survey question 2.]	

What was the cost of the boat when it was purchased?

Cost of boat	Percent
Less than $500	3
$500-$999	7
$1,000-$1,999	12
$2,000-$2,999	12
$3,000-$3,999	14
$4,000-$4,999	6
$5,000-$5,999	14
$6,000-$6,999	11
$7,000-$7,999	4
$8,000-$9,999	5
$10,000 or more	10
No answer	2
Average cost of boat:	$5,650
BASE: Total commercial/ recreational fisherman	(200)
[Survey question 3.]	

What is your usual launching location?

Response	Percent*
Keauhou	50
Honokahou	36
Kailua-Kona	8
Other	18
No answer	1
BASE: Commercial/recreational fishermen who trailer their boat to a launching site	(173)
[Survey question 66.]	

*Total percentages exceed 100% because multiple responses were accepted.

Fishing Practices

Eighty percent of the population surveyed used their boat only for fishing. Another 18% used it mainly for fishing or equally for fishing and other uses. Only 2% said they rarely used their boat for fishing. Over the entire sample, an average of 93% of all boat-use time was spent on fishing.

Overall, the average number of deep-sea fishing trips taken annually was 69. Just under half the population (47%) took fewer than 30 open-ocean fishing trips in 1976. At the upper end, nearly one-quarter of those interviewed (22%) went out 100 times or more a year.

Although about 12% of those interviewed usually fished alone and another 9% fished with four or more people aboard, the usual number of persons per trip was two (47%). Another 31% usually fished with three persons aboard the boat.

Over the entire sample population, 7 hours was the average duration of fishing trips. Only 14% said they usually fished for less than 6 hours per day and 17% for 10 hours or more.

Questions were asked for fishing activity over the past year from December 1975 to the time of the interview in December 1976 or January 1977.

How many boat trips did you take into the open ocean for the purpose of fishing for marlin, ono, ahi, aku, or mahimahi?

Number of trips (year from December 1975)	Percent
Less than 10	18
10-19	14
20-29	15
30-39	9
40-59	9
60-79	11
80-99	2
100-199	11
200-299	8
300 or more	3
Average number of trips:	69 trips
BASE: Total commercial/ recreational fishermen	(200)
[Survey question 10.]	

On those trips, what is the average or usual number of persons aboard the boat, including yourself?

Response	Percent
Respondent only	12
2 people	47
3 people	31
4 people	8
5 people	1
No answer	1
Average number of people:	2 people
BASE: Total commercial/ recreational fishermen	(200)
[Survey question 11.]	

Thinking of those fishing trips into the open ocean, what would be the average or usual duration of the fishing trip? About how many hours did you stay out each time?

Number of hours [per trip]	Percent
3 or less	2
4	5
5	7
6	28
7	11
8	24
9	6
10	12
More than 10	5
Average number of hours	7 h
BASE: Total commercial/ recreational fishermen	(200)
[Survey question 12.]	

Fish Catch, Disposition, and Earnings

More Kona fishermen caught ono (wahoo) than any other species, followed by ahi (yellowfin tuna). Eighty-three percent of those interviewed caught at least one ono and 80% caught ahi. Mahimahi (dolphinfish) and aku (skipjack tuna) were caught by about 70% of the fishermen interviewed. Aku and ahi were caught in the greatest numbers.

Billfish were caught infrequently by this population, probably because they have far less commercial value than the other fishes and therefore are fished for less often. Only 8% caught striped marlin, 12% caught sailfish and black marlin, 20% caught shortbill spearfish, and 40% caught blue marlin.

The mean number caught and mean number of pounds caught of each species is described below. It should be emphasized that this average or mean is based on those catching one or more of that species and, therefore, cannot be projected to the total population.

Annual catch	Average number caught	Average pounds caught	Percentage of fishers who catch species
Ono	18	560	83
Ahi	35	3,290	80
Aku	52	260	70
Mahimahi	8	200	70
Blue marlin	5	1,200	40
Black marlin*	5	1,670	12
Striped marlin	2	280	8
Shortbill spearfish	3	100	20
Sailfish	1	70	12

[Survey question 13.]

*The NMFS biologists have found a much higher percentage of blue marlin compared with black marlin, suggesting that some marlin may be misidentified in this survey.

For each species of fish caught, all boat owners in the sample were asked how many pounds they kept for their own use or gave away to family and friends versus how many pounds they sold.

The table below shows the estimated mean number of pounds in each of those categories (based on data reported by those who caught one or more of that species during the year). Ahi was, by far, the leader in pounds sold by percent of total catch, with only about 1 pound retained for the respondents' own use for each 6 pounds sold. Just over 70% of the mahimahi catch and about 65% of the blue marlin catch was sold. Aku and black marlin, as shown, were more likely to be kept than sold. With respect to ono, striped marlin, spearfish, and sailfish, the number of pounds kept and the number of pounds sold are about equal.

Annual catch	Pounds kept/ given away (mean)	Pounds sold (mean)	Pounds caught (mean)
Ono	250	300	560*
Ahi	500	2,970	3,290
Aku	180	70	260
Mahimahi	60	150	200
Blue marlin	440	780	1,200
Black marlin	1,140	580	1,670
Striped marlin	140	140	280
Shortbill spearfish	50	50	100
Sailfish	30	30	70
[Survey question 13.]			

*The species means do not always sum exactly to the total mean because the algorithm (for all means) used data that had been rounded and then assigned to graduated group intervals.

Mean earnings from the sale of fish ranged from a low of $20 for those catching sailfish to almost $3,000 for those catching ahi. As shown in the table below, ahi is by far the most important commercial catch, in terms of pounds caught and dollars earned. Mahimahi ranks highest in price paid per pound at an average value of $1.95, followed by ahi at $1.00 and ono at $0.87. The least valuable catch, on a per-pound basis, is blue marlin at an estimated mean of $0.23.

Annual catch	Pounds sold (mean)	Earnings (mean)	$ per pound (mean)
Ono	300	$ 260	$ .87
Ahi	2,970	2,970	1.00
Aku	70	50	.71
Mahimahi	150	290	1.95
Blue marlin	780	180	.23
Black marlin	580	190	.33
Striped marlin	140	50	.36
Shortbill spearfish	50	40	.80
Sailfish	30	20	.67
[Survey question 13.]			

The final table in this series provides information about personal earnings from the sale of all species of fish included in the study. Overall, the estimated mean income from combined sales was $2,939. This figure is based upon earnings data from all boat owners interviewed and the mean, therefore, takes into account the 31% of the population who had no income from the sale of fish. The estimated mean of $2,939 is, then, projectable to all boat owners in the sample population.

Annual catch	Average number caught	Average pounds caught	Average pounds kept/ given away	Average pounds sold	Average earnings
Ono	18	560	250	300	$ 260
Ahi	35	3,290	500	2,970	2,970
Aku	52	260	180	70	50
Mahimahi	8	200	60	150	290
Blue marlin	5	1,200	440	780	180
Black marlin	5	1,670	1,140	580	190
Striped marlin	2	280	140	140	50
Shortbill spearfish	3	100	50	50	40
Sailfish	1	70	30	30	20

BASE: Variable--those catching one or more of each species.
[Survey question 13.]

In summary, for the 200 people interviewed as a whole:

What were your total annual earnings from the sale of _____?

Species	Average earnings
Ono	$ 217
Ahi	2,376
Aku	35
Mahimahi	203
Blue marlin	71
Black marlin	23
Striped marlin	4
Shortbill spearfish	8
Sailfish	2
Total	$2,939
BASE: [Survey question 13f.]	(200)

Expenditures

The following set of tables presents information about the expenditures of boat owners for the calendar year 1976. It is of particular interest to note that overall, the mean annual expenditure of boat owners interviewed exceeded mean earnings by about $1,800.

Mean annual expenditure	$4,740
Mean annual earnings	2,939
Mean loss	1,801

[Survey question 14.]

Among the total sample, the largest expenditure was for fuel and oil used by the boat and for the transporting-vehicle (for trailered boats) ($1,248). This was followed by average boat payment costs of $649, fishing tackle purchases amounting to $527, and expenses of $471 in engine repairs.

The following table presents the annual mean for all expense items included in the survey:

Expense item	Mean annual expenditure
Boat/vehicle fuel and oil	$1,248
Boat payments	649
Fishing tackle purchase	527
Engine repairs	471
Food and beverages	258
Vehicle payments	197
Fishing tackle repairs	175
Ice	168
Live bait	148
Boat insurance	136
Electronic equipment repairs	117
Vehicle insurance	106
Vehicle repairs	93
Share of fish	84
Hull repairs	75
Tournament fees	29
Licenses and fees	23
Salaries	21
Commissions	19
Mooring fees	9
Club or association fees	8
Other expenses	179
All expenditures combined	$4,740
BASE:	(200)

[Survey question 14.]

When respondents were asked about "other expenses" not specifically mentioned in the questionnaire, the most frequently cited costs were for trailer acquisition or repair, the purchase of a new primary or auxiliary engine, and radio acquisition or repair. As shown, the mean expenditure for "other expenses" was $179.

Finally, in the general area of expenditures, fishermen were asked first, if they personally did any repairs and maintenance on their own boat, transporting vehicle, or other equipment, and if so, about how many hours per year they worked on it. Eighty-eight percent said they did at least some of their own maintenance. The mean number of hours spent annually was 108, or about 14 working days.

Personal Characteristics of the Sample Population

Ninety-eight percent of the boat owners interviewed were males and the mean age of all respondents was 44 years. Thirty-seven persons (or about 18% of the sample) listed commercial fishing as their primary occupation, although 70% had a commercial fishing license. A plurality (28%) of those interviewed were working in trades or laborer occupations. The estimated mean income of respondents was about $13,500; 11% of the population had an annual income of $5,000 or less, and 5% earned over $30,000.

Among those who said they had income beyond that from their primary occupation, the sale of fish was by far the major source. More than half the sample realize secondary income from commercial fishing. Another 34 persons had secondary income from occupations other than commercial fishing; mentioned most often were ranching or farming (12 persons) followed by real estate sales and investments (8 persons). Most (86%) of those who have secondary incomes earn $5,000 or less annual from this part-time occupation.

Seventy-three boat owners, or about 37% of those interviewed, belong to a trolling club.

What is your primary income-producing occupation?

Occupation	Percent
Trades	28
Commercial fishing	18
Real estate/sales/investments	8
Technical	7
Supervisory/managerial	6
Tourism	6
Ranching/farming	6
Professional	4
Civil service	3
Retired	11
Other	3
BASE: Total commercial/recreational fishermen	(200)

[Survey question 17.]

Finally, are you a member of a trolling club?

Response	Percent
Yes	37
No	63
BASE: Total commercial/recreational fishermen	(200)

[Survey question 20.]

Characteristics of the Fleet by Whether Respondents Had a Commercial Fishing License or Not

This section of the report describes responses to important questionnaire variables by whether the boat owner had a commercial fishing license or not.

Boat owners with commercial licenses have, overall, more money invested in their boats. At the time of purchase, there was a mean difference of about $1,700 in the initial cost between the two subgroups. At the time of the interview, persons with a commercial license estimated the mean value of their boat as $6,780 versus $4,930 for non-licensees. The percent of increase in the boat's value from date of purchase remains nearly constant for both segments, however, with a mean increase of approximately 10% overall.

Commercially-licensed boat owners were significantly more likely to use their boat entirely for fishing. Eighty-eight percent of these said all of their boat-use time was spent fishing while only 61% of unlicensed boat owners without commercial fishing licenses said their boat was used entirely for fishing.

The difference in engine horsepower between the two groups is minimal. Mean horsepower for commercial licensees was 111 h.p. and for non-licensees, 98 h.p.

Fishermen with commercial licenses make, on the average, more than twice as many fishing trips annually than those without licenses, and the duration of their trips tend to be somewhat longer:

	Total	Have commercial license	Do not have commercial license
Number of trips annually (mean)	69	82	38
Number of hours at sea per trip (mean)	7.5	8	7

All species of fish included in the study were caught by a higher percentage of license holders than non-licensees. Most notable differences were in percent catching ahi (88% of the commercial fishermen caught, 62% of the non-commercial fishermen caught), mahimahi (77% versus 54%), and blue marlin (47% versus 23%).

The average number of each species caught did not vary greatly between the two subgroups, except in the case of ahi, where those with a commercial license caught about three times as many, on the average, as those without a license.

Average pounds caught corresponds to average number caught, with the greatest variance between licensees and non-licensees being in pounds of ahi caught. Commercially-licensed fishermen caught more than three and one-half times as many pounds of ahi.

As would be expected, those with a commercial license sold the majority of their fish catch (except in the case of aku, which is often used as a baitfish) and those without a license kept or gave away the majority of their catch. By percentage of the total pounds caught of each species, mahimahi was the fish most often sold by non-licensees, followed by ahi.

Income from fish sales was many times higher for those with a commercial license. The annual mean for commercially-licensed fishermen was $4,098 versus a mean of $286 for those without a license.

Total annual expenditures for commercially-licensed fishermen was almost three times that of non-licensed fishermen. This is not surprising in light of other related findings about license holders, such as: they had more expensive boats with somewhat larger engines, went fishing more often, stayed out longer, and caught more fish. All of these characteristics and behaviors would necessarily result in a greater expenditure in nearly all categories. In addition, they were far more likely to keep records, which leads to recall of cost items others may have overlooked.

A comparison of earnings and expenditures of both subgroups shows that each had boat and fishing expenditures in excess of earnings from fish sales. The mean difference, however, was less for commercially-licensed fishermen ($1,821) than for non-licensed respondents who spent an average of more than $2,000 per year and had average earnings of less than $300. Mean earnigs for unlicensed fishermen should be interpreted with caution, however, since the majority (63%) of respondents in that subgroup sold no fish at all.

Finally, commercially-licensed boat owners spent close to twice as many hours annually in personally maintaining their vessels. The mean number of maintenance/repair hours for licensed fishermen was 112 per year; for unlicensed fishermen it was 57 hours.

Annual expenditures	Total	Have commercial fishing license	Do not have commercial fishing license
Boat payments	$ 649	$ 833	$ 230
Vehicle payments	197	241	98
Mooring fees	9	10	5
Boat/vehicle fuel and oil	1,248	1,557	542
Engine repairs	471	571	244
Hull repairs	75	98	25
Electronic equipment repairs	117	130	86
Fishing tackle repairs	175	225	61
Vehicle repairs	93	116	41
Fishing tackle purchase	527	649	249
Live bait	148	205	18
Ice	168	227	35
Boat insurance	136	151	103
Vehicle insurance	106	111	94
Licenses and fees	23	27	16
Salaries	21	30	--
Commissions	19	27	--
Share of fish	84	117	8
Food and beverages	258	296	170
Club or association fees	8	10	5
Tournament fees	29	32	21
Other expenses	179	256	5
All expenditures combined:	4,740	5,919	2,056
BASE: [Survey question 14.]	(200)	(139)	(61)

What was the total pounds of _____ caught?

Species	Annual average pounds caught: Total	Have commercial fishing license	Do not have commercial fishing license
Ono	468	445	504
Ahi	2,632	3,388	910
Aku	179	197	138
Mahimahi	140	169	65
Blue marlin	474	585	232
Black marlin	200	124	375
Striped marlin	20	22	16
Shortbill spearfish	20	20	24
Sailfish	8	10	3
BASE: [Survey question 13c.]	(200)	(139)	(61)

What were the total earnings from the sale of _____ ?

Species	Annual average earnings		
	Total	Have commercial fishing license	Do not have commercial fishing license
Ono	$ 217	$ 265	$ 94
Ahi	2,376	3,353	162
Aku	35	49	--
Mahimahi	203	277	22
Blue marlin	71	103	7
Black marlin	23	32	--
Striped marlin	4	5	--
Shortbill spearfish	8	11	1
Sailfish	2	3	--
Total for all species	$2,939	$4,098	$286
BASE: [Survey question 13f.]	(200)	(139)	(61)

Characteristics of the Fleet by Level of Earnings from Sale of Fish

This section describes the characteristics of the sampled population cross-tabulated by the level of earnings the respondents received from the sale for fish.

The majority of the boat owners interviewed (62%) earned less than $1,000 during 1976 from the sale of fish. Forty-eight persons (24%) earned more than $1,000 but less than $5,000, and about 15% (29 persons) earned $5,000 and above.

There is a positive correlation between boat length and level of earnings. There is, however, a mean difference of only 2 ft in boat length between the lower and the higher earnings levels.

Boat owners with higher fish sale earnings tended to have a more expensive boat. The following condensed table shows the mean purchase price and current value of vessel by level of income from sale of fish:

	Annual income from sale of fish		
	None to $999	$1,000-$4,999	$5,000 and over
Cost of boat when purchased (mean)	$5,230	$6,070	$6,720
Current value of boat (mean)	5,580	7,010	7,610

Persons with higher earnings also had, on the average, an engine with greater horsepower. Boat owners at the lower income level had an average horsepower of 98; at the moderate income level, average horsepower was 120; and at the higher income level, average horsepower was 124 h.p.

Not surprisingly, a strong correlation exists between the number and duration of fishing trips and income from the sale of fish. The following condensed table provides the mean for these fishing practice variables cross-tabulated by the income from sale of fish:

	Annual income from sale of fish			
	Total	None to $999	$1,000-$4,999	$5,000 and over
Number of annual fishing trips (mean)	69	30	80	212
Usual duration of trip in hours (mean)	7	6	8	9

Those in the higher income category are generally more likely to have caught at least one of each species of fish than those in the moderate and lower earnings category.

The greatest variance by the three income categories centers around ahi catch. The following condensed table presents differences in ahi catch, disposition, and earnings as related to annual fish sale income.

	Annual income from sale of all species		
Ahi	None to $999	$1,000-$4,999	$5,000 and over
Mean number caught	5	22	134
Mean pounds caught	523	2,251	12,218
Pounds kept or given away	396	500	268
Pounds sold	129	1,198	12,510
Mean earnings	$99	$794	$12,861

Catching and selling ahi was clearly the key to realizing any substantial income from commercial fishing.

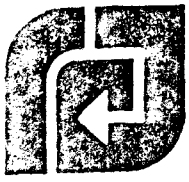
Overall, average annual expenditures coincided with categories of income from sale of fish, with expenditures rising as success in catching and selling fish increased. Mean annual expenditures for those earning 0-$999 was $2,574; for those earning $1,000-$4,999 it was $5,308; and in the highest income category ($5,000 and over) mean expenditures total an impressive $12,970.

The subgroup most likely (94%) to personally do their own boat repair and maintenance was the middle income group (those earning from $1,000-$4,999 from fish sales). With respect to annual hours spent on maintenance, the middle and high income groups spent about equal amounts of time (142/143 hours). Those earning less than $1,000 from fish sales spent about 65 hours per year working on their vessels.

Annual expenditures	Average expenditure			
	Total	None to $999	$1,000-$4,999	$5,000 and over
Boat payments	$ 649	$ 442	$ 816	$ 1,247
Vehicle payments	197	137	245	374
Mooring fees	9	7	14	2
Boat/vehicle fuel and oil	1,248	506	1,524	3,936
Engine repairs	471	238	488	1,422
Hull repairs	75	82	49	93
Electronic equipment repairs	117	116	77	182
Fishing tackle repairs	175	82	295	366
Vehicle repairs	93	73	43	264
Fishing tackle purchase	527	267	615	1,514
Live bait	148	24	111	728
Ice	168	40	150	733
Boat insurance	136	104	200	160
Vehicle insurance	106	102	80	165
Licenses and fees	23	22	26	28
Salaries and wages	21	--	7	129
Commissions	19	1	--	129
Share of fish	84	10	144	297
Food and beverages	258	141	246	763
Club or association fees	8	7	13	7
Tournament fees	29	18	56	29
Other expenses	179	155	109	402
Total expenditure	4,740	2,574	5,308	12,970
BASE: [Survey question 14.]	(200)	(123)	(48)	(29)

What were your total earnings from the sale of _____?

Species	Annual average earnings			
	Total	None to $999	$1,000-$4,999	$5,000 and over
Ono	$ 217	$ 51	$ 249	$ 846
Ahi	2,376	99	794	12,861
Aku	35	3	43	171
Mahimahi	203	170	132	441
Blue marlin	71	7	126	256
Black marlin	23	4	15	112
Striped marlin	4	--	3	11
Shortbill spearfish	8	1	16	20
Sailfish	2	*	3	7
Total	$2,939	$335	$1,381	$14,725
BASE: [Survey question 13f.]	(200)	(123)	(48)	(29)



research associates

Suite 909
1441 Kapiolani Blvd.
Honolulu, Hawaii 96814
Phone 947-3794

STUDY OF BIO-ECONOMICS AND OPTIMAL MANAGEMENT CRITERIA FOR UTILIZATION OF PACIFIC BILLFISH

MODULE I

PREPARED FOR:

NATIONAL MARINE FISHERIES SERVICE
HONOLULU LABORATORY

BY:

RESEARCH ASSOCIATES

JULY 1977

APPENDIX

COMMERCIAL & RECREATIONAL FISHING QUESTIONAIRE

Hello, I'm _____ from Research Associates. We're working as consultants to the National Marine Fisheries Service to develop information about the value of commercial and recreational fishing to the people of the Kona Coast. Your frank and open answers will help provide the basis for a fisheries management plan which will benefit the local fishing industry here. All of your answers will be strictly confidential, of course.

Screening: For this study, we are interviewing commercial and recreational fishermen who have fished for marlin, ono, ahi, or mahi-mahi at some time during the past twelve months. Have you fished for these species during the past year?

(___) Yes (CONDUCT INTERVIEW)
(___) No (TERMINATE INTERVIEW)

Fine. First, I'd like to ask you some questions about your boat and about the kinds of fishing you do.....

Q.1 What is the length of your boat? _____ ft.

Q.2 How many years have you owned your present boat? _____ yrs.

Q.3 What was the cost of the boat when it was purchased? $_____

Q.4 What would you say is the value of the boat today? $_____

Q.5 Is your boat used entirely for fishing, mainly for fishing, about equally for fishing and other purposes, or is it rarely used for fishing?

1 (___) entirely for fishing (SKIP TO Q.6)
2 (___) mainly for fishing
3 (___) equally for fishing and other uses
4 (___) rarely for fishing

Q.5a About what percent of your total boat-use time is spent on fishing? _____%

Q.6 Is your boat trailered to the pier, or is it moored?

1 (___) trailered
2 (___) moored

Q.6a At what pier is it moored?

1 (___) Keauhou
2 (___) Kailua-Kona
3 (___) Honokahou
4 (___) Other (specify) _____

Q.6b What is your usual launching location?

1 (___) Keauhou
2 (___) Kailua-Kona
3 (___) Honokahou
4 (___) Other (specify) _____

COMMERCIAL AND RECREATIONAL FISHING QUESTIONNAIRE

RESEARCH ASSOCIATES
DECEMBER 1976

RESPONDENT'S NAME _____

ADDRESS _____

PHONE _____

INTERVIEWER'S NAME _____

DATE OF INTERVIEW _____

LENGTH OF INTERVIEW _____

RA #03400

Now, we need to have some information about your fish catches for the past year. For this study, we are interested in the larger, open-ocean fish such as ono, ahi, aku, mahi-mahi, and different marlin species.....

Q.13	a. Did you catch any (name) during the past twelve months?	b. How many did you catch?	c. Total lbs. caught	d. How many lbs. did you keep for yourself or give away?	e. How many lbs. did you sell?	f. What were your total earnings from the sale of (name)?
Ono	Caught (___) Not Caught (___)					
Ahi	Caught (___) Not Caught (___)					
Aku	Caught (___) Not Caught (___)					
Mahi-mahi	Caught (___) Not Caught (___)					
Blue marlin	Caught (___) Not Caught (___)					
Black marlin	Caught (___) Not Caught (___)					
Striped marlin	Caught (___) Not Caught (___)					
Shortbill spearfish	Caught (___) Not Caught (___)					
Sailfish	Caught (___) Not Caught (___)					

(GO THROUGH QUESTIONS a, b, c, d, e, and f FOR EACH FISH LISTED)

Q.7 Does your boat have an outboard engine, an inboard engine, or an outboard/inboard engine?

1 (___) outboard
2 (___) inboard
3 (___) outboard/inboard

Q.7a And what horsepower is that? _____

Q.8 Do you currently have a commercial fishing license?

1 (___) Yes
2 (___) No

Q.9 Do you keep a boat log or other kinds of records about the following items?

	Records	No Records
Number of fishing trips	1 (___)	2 (___)
Number of persons aboard	1 (___)	2 (___)
Hours at sea	1 (___)	2 (___)
Engine time	1 (___)	2 (___)
Amount of fish caught	1 (___)	2 (___)
Boat expenditures	1 (___)	2 (___)

Now, thinking of the past twelve months.....that would be from December 1975 until the present date....

Q.10 How many boat trips did you take into the open ocean for the purpose of fishing for marlin, ono, ahi, aku, or mahi-mahi? Please check your records, if possible; if not, give us your best estimate. (FOR ALL SUBSEQUENT ANSWERS, INDICATE "E" FOR ESTIMATES AND "R" FOR ANSWERS FROM RECORDS.)

_____ boat trips

Q.11 And on those trips, what is the <u>average</u> or <u>usual</u> number of persons aboard the boat, including yourself?

1 (___) Respondent only (1 person)
2 (___) Respondent and one other (2 persons)
3 (___) Respondent and two others (3 persons)
4 (___) Respondent and three others (4 persons)
5 (___) Respondent and four others (5 persons)
6 (___) More than respondent and four others (5+ persons)

Q.12 Again, thinking of those trips into the open ocean, what would be the <u>average</u> or <u>usual</u> duration of the fishing trip? About how many hours did you stay out each time?

_____ hours

Q.15a About how many hours would you say you spent working on boat-related repairs and maintenance in the past twelve months?

_____ hours

Now, we'd like to ask you some questions for classification purposes only.....

Q.16 Which of the following categories include your age?

1 (___) 18 - 24 years
2 (___) 25 - 34 years
3 (___) 35 - 44 years
4 (___) 45 - 54 years
5 (___) 55 - 64 years
6 (___) 65 years and over
7 (___) Refused

Q.17 What is your primary income-producing occupation?

1 (___) commercial fishing
2 (___) other (specify) _____

Q.18 And what is your annual income from that occupation? (SHOW CARD)

_____

Q.19 What other, if any, sources of personal income do you have.....this would include income from the sale of fish (IF NOT MENTIONED AS THE ANSWER TO THE PREVIOUS QUESTION), income from another occupation, or State assistance from the Department of Social Services and Housing.

1 (___) no other sources of income (GO TO Q.20)
2 (___) income from sale of fish (GO TO Q.19b)
3 (___) other occupation (GO TO Q.19a and b)
4 (___) Department of Social Services and Housing (GO TO Q.19b)

a. What is your other occupation?

_____

b. How much annual income do you receive from this source? (SHOW CARD)

_____

Q.20 Finally, are you a member of a trolling club?

1 (___) Yes
2 (___) No

a. Which club is that?

1 (___) Kona Mauka Trollers
2 (___) Kona Iki Trollers
3 (___) Both of the above
4 (___) Other (specify) _____

Thank you very much for your help. I'd like to mention again that the information you have given us will be held in strictest confidence and will not be identified with you personally or with your name.

Someone from my company may telephone, however, to verify that this interview was conducted.

Mahalo!

Sex of respondent: (RECORD, DO NOT ASK)

1 (___) Male
2 (___) Female

Again, for the past twelve months....we need to ask about your expenses related to fishing for marlin, ono, ahi and mahi-mahi. Please check your records, if possible, or give your best estimate for each category.

Q.14	Item	Annual Costs
a. First, if you are making payments on your boat and/or vehicle you use to transport your boat, we would like to know what these payments have amounted to in the past year.	Boat Payments	
	Vehicle Payments	
b. (IF BOAT MOORED) What were your mooring fees?	Mooring Fees	
c. How much did you spend for boat fuel and oil? for fuel and oil for your transporting vehicle, if applicable?	Boat Fuel and Oil	
	Vehicle Fuel and Oil	
d. How much did you spend on engine repairs? repairs on the hull? repairs on any electronic equipment? fishing tackle repairs? repairs and maintenance of your transporting vehicle?	Engine Repairs	
	Hull Repairs	
	Electronic Equipment Repairs	
	Fishing Tackle Repairs	
	Vehicle Repairs	
e. What is the total amount you spent for fishing tackle, including rods and reels, lures, hooks and leaders, line, and skirts and leadheads?	Fishing Tackle	
f. How much did you spend on live bait?	Live Bait	
g. How much did you spend for ice?	Ice	
h. How much did you spend on insurance for your boat? for your transporting vehicle?	Boat Insurance	
	Vehicle Insurance	
i. What is the total amount you spent for licenses and fees, such as your excise tax license, your commercial fishing license, and your boat registration?	Licenses and Fees	
j. What is the total amount you spent on salaries, commissions, and "share-of-fish" to persons who help aboard your boat?	Salaries	
	Commissions	
	Share-of-fish	
k. How much was spent for food and beverages for you and others you may have had aboard?	Food and Beverages	
l. How much was spent for club or association fees?	Club or Association Fees	
m. How much was spent for tournament fees?	Tournament Fees	
n. Can you think of any other significant boat-related expenses you have incurred during the past year that we haven't mentioned? If so, what are they and how much did you spend?	Other _____	

Q.15 Do you personally do any of your own repairs and maintenance on your boat, vehicle, or fishing equipment?

1(___) Yes (GO TO Q.15a)
2(___) No (SKIP TO Q.16)